Chapter 8
Developing Regulatory Tools

8.1 Introduction

Regulating activities that have the potential to impact wetlands is the "backbone" of any local government's wetland protection program. Clearing trees and other vegetation, disturbing the soil, changing the movement of surface water and groundwater, and constructing industrial, commercial, or residential developments, together with their supporting infrastructure and their accompanying noise and light, can all significantly affect adjacent and nearby wetlands (see Volume 1, Chapters 2 through 4).

As described in Chapter 2, the Washington State Growth Management Act (GMA) specifically requires that local governments adopt development regulations that include the best available science to protect the functions and values of critical areas (RCW 36.70A.172). Development regulations are one of the primary means of implementing the goals and policies in a comprehensive plan.

The information presented in this chapter is intended to assist local governments in developing a regulatory program for protecting wetland functions and values. Critical area regulations fit into Step 2 in the four-step framework described in this volume (Figure 8-1). They are one part of the package of solutions recommended to protect existing wetland functions and values from future human impacts.

Historically, most local governments have relied upon regulation as the sole means of protecting wetlands. A regulatory permitting program can be very effective at limiting some of the adverse impacts associated with new development based on our understanding of the scientific literature in Volume 1. However, the synthesis of the science makes it clear that reliance upon a regulatory approach to case-by-case decision-making as the sole means of protecting wetlands will result in significant loss of wetland functions. Wetland regulations are most effective in preventing direct physical loss of wetland area and functions resulting from a change in land use, but regulations that focus on the site scale are not effective in addressing the cumulative impacts from larger scale changes in landscape processes.

Using the landscape analysis information described in previous chapters can help in developing regulations that protect not only the functions of individual wetlands, but protect some landscape processes as well. This is best done at a subbasin or subarea scale, where specific regulations can be developed to prevent degradation of water flow processes and to target protection of connected habitats.

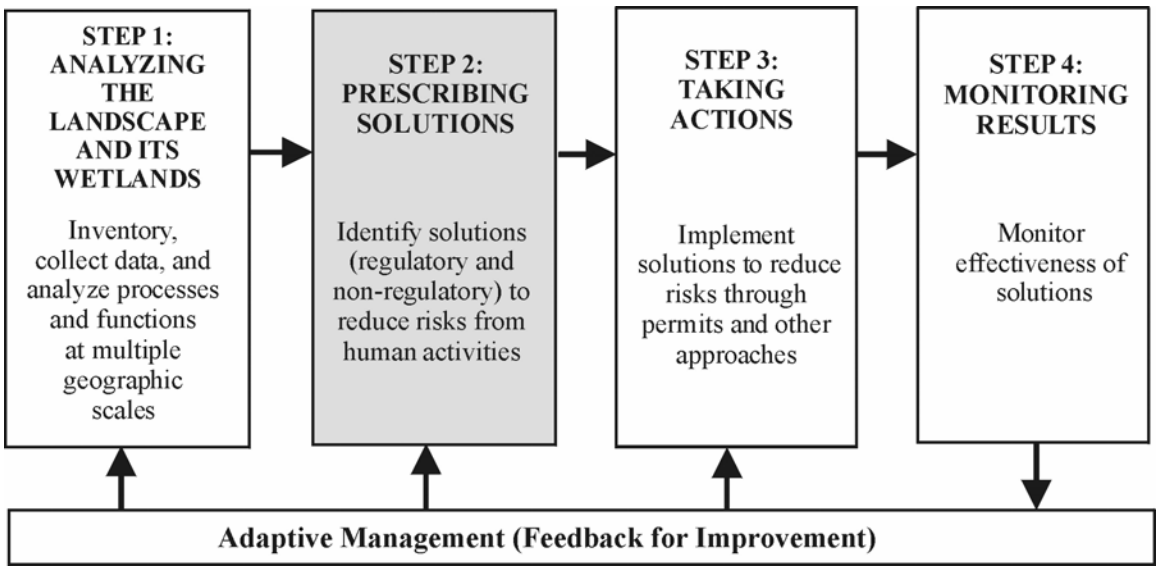

Figure 8-1. Developing regulations is part of Step 2 in the four-step framework discussed in this volume.

Section 8.2 of this chapter discusses several factors that should be considered when establishing the goals of regulations, such as balancing predictability with flexibility, the expertise of in-house staff to review wetland reports and permits, the assessment of risk, and the use of a separate critical areas permit vs. incorporating provisions for critical areas throughout a jurisdiction's code. Section 8.3 discusses the specific elements that need to be addressed in local critical area regulations, such as identifying wetlands, the applicability of regulations and permitting schemes, regulated activities and exemptions, wetland ratings, buffers, etc. The last section of this chapter (Section 8.4) briefly describes how to monitor regulatory programs.

The appendices listed in the shaded box below contain examples of implementing language (e.g., for regulations, buffers, wetland ratings, criteria for technical experts, etc.) and other information.

Important information is provided in appendices

Supporting information and additional detail for the topics discussed in this chapter are provided in a series of appendices (8-A through 8-G), listed below. *Chapter 8 and all of these appendices should be reviewed before a local jurisdiction decides to adopt any of the recommendations presented in Volume 2 into its critical area regulations.*

Appendix 8-A: Protecting Wetland Functions – An Overview of Considerations for Management synthesizes the information available on what is needed to protect or replace wetland functions. The discussion is organized by the three major groups of functions (water quality, hydrology, wildlife habitat) and by the different types of wetlands with special characteristics used in the *Washington State Wetlands Rating System* (bogs, Natural Heritage wetlands, etc.).

Appendix 8-B: Recommendations for Elements of a Wetland Regulatory Ordinance contains specific recommendations for ordinance language in a format similar to that used in many local critical area ordinances. This appendix revises the wetlands regulatory code language found in Appendix A of CTED's *Critical Areas Assistance Handbook* (November 2003).

Appendix 8-C: Guidance on Widths of Buffers and Ratios for Compensatory Mitigation to be Used with the Western Washington Wetland Rating System provides detailed guidance on buffers, ratios for compensatory mitigation, and other measures for protecting wetlands that are linked to the *Washington State Wetlands Rating System for Western Washington*.

Appendix 8-D: Guidance on Widths of Buffers and Ratios for Compensatory Mitigation to be Used with the Eastern Washington Wetland Rating System provides detailed guidance on buffers, ratios for compensatory mitigation, and other measures for protecting wetlands that are linked to the *Washington State Wetlands Rating System for Eastern Washington*.

Appendix 8-E: Rationale for Draft Guidance on Buffers and Other Protection for Wetlands explains the rationale for the recommendations about buffers presented in Appendices 8-C and 8-D. It discusses why buffers of certain widths are recommended for wetlands with different levels of functions or for special wetland types (bogs, etc).

Appendix 8-F: Rationale for the Draft Guidance on Ratios for Compensatory Mitigation to be Used with the Wetland Rating System explains the rationale for the recommendations about compensatory mitigation ratios presented in Appendices 8-C and 8-D. It describes how mitigation ratios are established based on risk of failure and temporal loss of functions, further refined to reflect the category and type of wetland.

Appendix 8-G: Hiring a Qualified Wetlands Specialist provides guidance on hiring a specialist to provide wetlands services such as delineations, functions assessments, permit preparation, etc. It discusses the basic qualifications that should be considered and suggestions for locating a specialist.

8.2 Establishing the Goals of Regulations

Establishing the goals of a regulatory program is the first step in determining what regulations make sense for a local jurisdiction. Some of the key questions a local government should ask include:

- Has a landscape analysis been conducted and have plans, policies, and zoning regulations been revised to reflect that information at the landscape scale?
- Are regulations the sole means of protecting wetlands, or are there non-regulatory approaches that will help in protecting wetland functions?

- How much is known about the types and extent of wetlands in the jurisdiction and how they function?
- How well do the current zoning and critical area inventory maps incorporate reliable information on where wetlands and other critical areas are located?

Generally, a regulatory program should aim to prevent any further loss or degradation of wetland area or functions, thereby helping to maintain landscape processes as well. Realistically, however, even a very stringent regulatory program will not completely prevent all impacts to wetlands because some impacts occur as a result of land use changes distant from wetlands. Thus, it is important to complement a regulatory permitting approach with both planning based on landscape analysis and non-regulatory elements (these are discussed in Chapters 6, 7, and 9 of this volume).

8.2.1 Balancing Predictability with Flexibility

Among the more common complaints about regulatory programs is that they are either too unpredictable or too inflexible. Generally, these two characteristics are at odds with one another. A very predictable (prescriptive) approach provides clear, consistent standards that applicants can rely on. However, such an approach may not allow for flexibility to address site-specific or unique situations from the perspective of the resource or from that of the landowner. On the other hand, a more flexible approach may fail to provide the degree of specificity that allows applicants to make decisions with some certainty of the outcome.

In developing or revising a wetland regulatory program, one must consider how to balance these two competing needs. A balanced approach may set "sideboards" with criteria for selecting within the range of allowable options, or a general standard with criteria for deviating from the standard. A more flexible approach implies more discretion on the part of local staff and managers and, thus, requires more staff time and a higher level of staff training and expertise in wetland ecology.

8.2.2 Staff Expertise and the Role of Third-Party Review

An important consideration in determining the appropriate regulatory approach is the capacity of local staff to exercise independent judgment in applying protection standards. As described above, a more flexible, less prescriptive approach requires more staff time and staff who are well versed in wetland ecology and management in order to make consistent and defensible decisions based on site- or situation-specific factors. Many local jurisdictions cannot afford to have this expertise on their staff and rely upon third-party review by a consultant who is retained by the local jurisdiction (usually at the applicant's expense), or through technical assistance from state or federal agencies.

8.2.3 Risk Management for Wetland Resources

In the end, the primary decision regarding the appropriate type and stringency of a regulatory approach for protecting wetlands is one of risk management. The key question is: *How much risk of loss or degradation of wetland functions and values is reasonable given what is known about the types of wetlands and their functions, the types of land uses and their impacts, and the other, complementary components of protection, including planning based on landscape analysis and non-regulatory programs?* The scientific literature does not and cannot say what the appropriate level of risk should be; it can only assess the potential consequences of this type of policy decision. The final determination of the level of risk that is appropriate is made at the local level. Risk assessment is discussed in greater detail in Chapter 10 of this volume.

8.2.4 Types of Regulations Used to Manage Wetlands

Although critical areas ordinances are most often assumed to be the sole source of regulation for wetlands and other critical areas, other code provisions may be directly relevant to the management and protection of critical areas. Some jurisdictions adopt critical areas provisions that establish a distinct permit that is required for any proposed activity within that type of critical area or its buffer. Other jurisdictions place provisions for consideration of critical areas and their buffers throughout their code, wherever consideration of the effects on critical areas is appropriate. For example, language requiring assessment of wetland/buffer provisions may be adopted into clearing and grading regulations.

Section 8.3.2 discusses in more detail the distinctions in applicability (that is, where and when critical area regulatory provisions are applicable). Section 8.3 discusses the considerations for establishing a wetland permit based regulation. If a local jurisdiction decides to utilize critical areas provisions linked to other existing regulations and permits (such as clearing and grading regulations), the same considerations described below should be considered, as applicable.

8.3 Important Elements of a Regulatory Program

The current general approach to wetland regulation at the local level can be summarized as: *Avoid - Buffer - Compensate*. This means:

- **Avoid** direct impacts to a wetland or its buffer to the extent practicable by allowing impacts only when there is no reasonable alternative;
- **Buffer** wetlands from indirect impacts through the retention of adjacent vegetated upland; and

- **Compensate** for unavoidable impacts by requiring the replacement of wetland and/or buffer area and function through the restoration, creation, enhancement, and/or preservation of wetlands and/or their buffers.

This approach has been used in areas of the Puget Sound lowlands since 1984 and throughout Washington for the past 10 years. With appropriate protection standards and consistent implementation, such provisions can go a long way toward protecting wetland functions and values that are not strongly linked to landscape processes. However, the review of the science in Volume 1 indicates that site-specific regulations alone will not protect all wetland functions, particularly those that are linked to landscape processes.

Following is a discussion of the recommended key elements that should be addressed in any local government's wetland regulatory program. For examples of recommended code language for each of these elements, please refer to Appendix 8-B.

8.3.1 Designating, Identifying, and Mapping Wetlands

The GMA requires that local governments designate and protect critical areas including wetlands (RCW 36.70A.170 and 172). The first step in regulating wetlands is to define what is being regulated and specify how these areas will be identified. The GMA provides the definition of wetlands and specifies how to identify and delineate them.

In designating wetlands for regulatory purposes, counties and cities are required to use the definition of wetlands in RCW 36.70A.030(20):

> *"Wetland" or "wetlands" means areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands do not include those artificial wetlands intentionally created from non-wetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway. Wetlands may include those artificial wetlands intentionally created from non-wetland areas created to mitigate conversion of wetlands.*

Wetlands are subject to a local government's regulatory authority if they meet the criteria in this definition. The GMA does not allow flexibility in adopting a modified definition of wetlands.

State legislation (RCW 36.70A.175) also requires local governments to use the *Washington State Wetlands Identification and Delineation Manual* (WAC 173-22-080) in implementing the GMA. The manual is used to identify the actual boundary of a wetland. The manual is based on the 1987 Corps of Engineers wetlands delineation

manual and incorporates changes made by the Corps since 1987. Since the Washington State manual and the Corps manual rely upon the same criteria and indicators for hydrology, soils, and vegetation, proper use of either manual should result in the same wetland boundary.

It is helpful to landowners and to regulatory staff to provide reliable information about the location and extent of wetlands in a local jurisdiction. This provides greater predictability for landowners and helps ensure that wetlands are accurately identified for regulatory purposes. However, many local governments do not have reliable maps of wetlands within their jurisdiction. Accurate inventories that have been checked on the ground can be time consuming and expensive to conduct. Although we recommend that local governments conduct field inventories, existing information can be used to produce a useable, if less accurate, map of wetland locations.

The National Wetlands Inventory (NWI) can be combined with local soil surveys to produce a map that shows the approximate location and extent of wetlands and their distribution in the jurisdiction. The NWI was completed by the U.S. Fish and Wildlife Service and the soil surveys by the Natural Resources Conservation Service (formerly called the Soil Conservation Service). For many areas of the state, the NWI and hydric soil maps are available in digital format.

When superimposed, the NWI and soil survey maps can serve as a useful starting point for mapping the general location of likely wetlands in a planning area. However local field-based maps are superior because of the potential inaccuracy of the NWI and soil surveys, which are based on interpretation of aerial photographs (some 15 to 20 years old). This makes the existence of some wetlands as well as the extent of others hard to identify. Typically, the hydric soils maps have more field verification than the NWI maps, although aerial photography is the main source of information for mapping. In addition, this overlay map cannot replace the need for site- or parcel-scale delineations when activities are proposed that might affect wetlands.

To ensure the protection of wetlands, the code should contain language that clearly gives the authority to regulate wetlands as they are defined, not as they are mapped. In other words, areas that meet the criteria to be defined as wetlands are regulated even if they are not mapped in an inventory. Further information on methods that local governments can use to analyze wetland resources is provided in Chapter 5 of this volume.

8.3.2 Applicability of Regulations

The applicability section of a code states what types of activities the code is intended to regulate. There are two general ways in which protection measures for wetlands and other critical areas can be triggered through code provisions: (1) wetland provisions are integrated throughout various applicable elements of the development code, or (2) a specific critical area (or wetland) permit is established which is required for activities that may influence critical areas. These two approaches are discussed below, along with code language that can be used to address applicability and the pros and cons of each approach.

Critical Areas Provisions Triggered by Development Permits

Provisions to protect wetlands or other critical areas can be initiated when any development permit (e.g., a grading, rezone, building, subdivision, short-plat permit, etc.) is required by the local jurisdiction. Whenever an applicant submits an application for a development permit, the code can be written to automatically allow the wetland provisions of the code to be applied to that permit. Thus, the code is written such that each development permit application allows staff to review and condition the application with the regulatory protection standards for wetlands from the code.

Applicability language: The applicability section of the code should state that the critical areas provisions of the jurisdiction apply to "any permitted activity if a wetland or its buffer is present on the subject property, or the proposed actions could result in adverse impacts to offsite wetlands and/or their buffers." The language can specify that "all development permits" are included, or the code can specify which development permits trigger the critical area provisions. Such language makes it clear that any action within the jurisdiction that requires a permit (e.g., grading, rezoning, building permit, subdivision, etc.) will be subject to the protection measures in the critical areas code.

For example, some jurisdictions apply critical area provisions to all newly formed lots created *after* implementation of the revised critical area provisions (i.e., the applicability language cites the date of the adoption of the new provisions). The jurisdiction requires all short-plats and subdivisions to utilize the new wetland protection standards AND they may exempt single-family building permits from wetland review for such new lots. This means that the new lots have the required critical area setbacks and buffers embedded into them, so the review of single-family building permits is not necessary to assure that they meet the provisions of the code. It also means that lots that were created *prior* to implementation of the current critical area standards (i.e., "grandfathered in") *may* not be subject to the new provisions (e.g., wetland rating, buffers and setbacks, etc.) if it would deny all reasonable use of the parcel. This is one means to address reasonable use provisions when new standards could possibly influence the reasonable use of an existing lot that was created under less restrictive standards. Although this may seem like a lessening of regulatory standards, it is a pragmatic approach to deal with the issue of reasonable use. This language also makes it implicit that any proposal to create new lots (e.g., a short-plat or long subdivision) requires implementation of the new standards.

Applicability language for development permits can also be modified to reduce the triggering threshold to zero for actions that pose a risk to wetlands and/or their buffers. For example, clearing of vegetation that falls below a minimum threshold square footage established for a clearing and grading permit does not trigger the requirement for the clearing and grading permit provisions. However, the applicability section of the clearing and grading code language can readily be amended to note that, "There is a zero threshold for any activity which may pose an adverse impact to wetlands and/or their regulated buffers; such activities will trigger the requirements of a clearing and grading permit." By this means, existing code language can simply be modified to extend the provisions for wetland review and conditioning to actions that would otherwise not trigger the underlying permit requirements.

Pros and cons: A benefit of this approach is that no new permitting mechanism needs to be established; review and conditioning for critical areas is linked directly to existing permit processes that applicants are already familiar with. Many jurisdictions are already employing this method in their codes, and thus major code revisions and changes in processes used to review permits would not be required. Some development permits (e.g., subdivisions and some rezones) trigger SEPA determinations that may provide a mechanism for greater analysis and public input in the decision-making process than a wetland-only permit process.

Initiating critical area provisions through development permits requires coordination between wetlands staff and the staff who condition and issue development permits (if they are different people). Such coordination is needed to ensure consistency in the provisions of approval for permits. The option of not having a separate wetland permit may require additional review fees for fee-supported staff (as would a distinct wetland-only permit), and may or may not require additional review time compared to a distinct wetland-only permit.

For an application to be subject to wetland review and conditioning, some type of development permit (clearing, grading, filling, etc.) must be triggered. If no development permit is required for an action, no wetland review process can be legally initiated, unless the applicability language is modified as noted above.

Separate Critical Area Permit

A separate critical areas permit process means that an applicant would be required to obtain a separate and distinct wetland (or critical area) permit whenever a wetland or its buffer is located on the site of a proposed action. This is a distinct permit that would be required *in addition* to any other development permit for a parcel. The applicability of this permit is linked to the presence of the critical area or its buffer on a site. The standards for when a permit would be required should be the same as the provisions for the development-related permits, including zero thresholds for actions such as grading, clearing of vegetation, or other physical alterations.

Applicability language: Code language is drafted for a wetland permit that identifies the activities that trigger the need to obtain the wetland permit. The language would have to specify actions, development permits, and/or thresholds of actions that would trigger the provisions of critical area review and obtaining a permit. Unlike the previous option, this applicability section would have to include *all* actions or thresholds that would trigger the wetland permit. (In the previous option, the applicability language of each existing development permit/action is modified to include wetland provisions.) A discussion and description of suggested regulated and exempted activities follows in the next section.

Pros and cons: Using a distinct wetland or critical areas permit involves many of the same issues described above for the first option. The advantage of a wetland-specific permit is that it allows staff to clarify conditions of approval, and perhaps, if the mechanism is established, to provide clarity to wetland permit monitoring and enforcement provisions. If the jurisdiction sets up a subsequent monitoring program, which is staffed to ensure that approved wetland permits are tracked and the conditions

implemented, then perhaps a wetland-specific permit would facilitate such tracking and response**.**

A wetland-specific permit requires wetland staff to coordinate all conditions from all development permits for a particular project to ensure consistency for wetland protection. A wetland-specific permit could possibly result in higher permit and review fees. It should be assumed that a jurisdiction would either hire technical staff to implement a distinct permit program, or require an applicant to pay for third-party review/conditioning of a wetland permit. Whether such fees would be higher than staffing for the other option may depend upon the fee structure of the jurisdiction.

There is a risk that the timing of multiple permit approvals may protract an applicant's timeline. Although state law requires a 120-day "clock" for permit review, in a worst-case scenario other development permits could be approved and issued prior to the wetland permit approval if wetland staff is backlogged or delayed.

8.3.3 Excepted Activities, Allowed Activities, and Exemptions

Critical areas ordinances are adopted to protect wetlands and their functions from the many types of activities that can adversely impact wetlands as described in Volume 1. Specifically, the GMA directs local governments to regulate all activities with a potential to affect the functions of a critical area and its buffer. At a minimum, it is important to regulate all activities that would directly impact a wetland and its buffer such as filling, draining, excavation, clearing, flooding, and tilling. Other activities that should be included are herbicide application, stormwater discharges, and water diversions and withdrawals.

However, some activities pose little threat to wetlands and can be exempt from regulatory review or can trigger a lower level of review. Exempt activities should be limited to those that will not have a significant impact on a wetland's structure and function (including its water, soil, or vegetation) and those which are expected to be very short term. Local governments should also consider the cumulative impacts from exempted activities.

A local government needs to demonstrate that there is scientific support for a given exemption. Likewise, a local government should not assume that an exemption is appropriate in the absence of science to refute the exemption. The scope, coverage, and applicability of a critical areas ordinance should capture the full range of activities that are detrimental to wetland functions. Therefore, exemptions should be supported by the scientific literature and be carefully crafted to minimize the potential for adverse impacts. The language should clearly state whether a given exemption is from applicable standards in the code or whether it is exempt from needing a permit but still must comply with the code.

Activities Excluded from Regulation

The types of activities that are excluded from wetland regulation are grouped in three categories in the example code provided in the *Critical Areas Assistance Handbook,* Appendix A (CTED 2003). They are **exempted activities, allowed activities, and exceptions.** These three categories allow varying degrees of activities or uses either without review, or in a way that avoids the regulations associated with critical areas, as explained in the following paragraphs.

The first category, **exempted activities**, are those activities that are excluded from critical areas regulations on the premise that they would have little or no effect, or that the activity is an emergency and delay of the action could result in threats to public health or safety. In addition to emergencies, these activities can include passive outdoor activities, forest practices regulated by the state, as well as specific operation, maintenance, or repair activities.

The second category, **allowed activities**, are those activities that, due to other regulations or previous reviews, are unlikely to result in critical areas impacts. Since these activities are not exempt, the wetland standards continue to apply and the underlying permit could be conditioned to ensure that the activity complies with critical areas protection.

The third category, **exceptions**, are granted in limited circumstances where a reasonable use permit is issued to only allow the minimum "reasonable" use of the property and avoid a constitutional taking. Refer to Section X.10.150 of CTED's example code provisions for additional guidance on reasonable use exceptions.

The sections below discusses the following types of wetlands and the types of activities that are often considered for exemptions in local critical area regulations. For each, we discuss the relevant scientific findings and provide recommendations for how they should be treated.

- Wetland size exemptions;
- Size of minimum wetland impact;
- Isolated wetlands;
- Prior converted wetlands;
- Irrigation-induced wetlands;
- Clearing, grading, and placement of fill;
- Ongoing agriculture;
- Conversion of wetlands to new agriculture;
- Conversion of agricultural lands to other uses;
- Noxious weed removal;

- Forest practices and conversions;
- Hazard tree removal;
- Non-compensatory restoration and enhancement; and
- Stormwater management and wetlands.

8.3.3.1 Wetland Size Exemptions

While recognizing that local governments have to make difficult choices about where to expend their efforts, we do not believe it is appropriate to recommend a threshold for exempting small wetlands because the scientific literature does not provide support for such a general exemption. Volume 1 (Chapter 5) documents the relationship between the lower levels of protection afforded to small wetlands and the resulting fragmentation and increase in distance between wetlands on the landscape as well as the important functions provided by small wetlands. The loss of small wetlands is one of the most common cumulative impacts on wetlands and wildlife in Washington.

If a local government, however, wants to consider exempting some wetlands under a certain size, this should be done in a context of the potential cumulative implications to justify the exemption (e.g., how many acres of wetlands would be affected, what functions would be most affected, how such impacts would be compensated, etc.). Consideration and documentation of the potential implications is critical to protecting wetland functions as well as landscape processes. The decision, therefore, is best made after reviewing the information generated from a landscape analysis (as outlined in Chapter 5 of this volume) for the geographic area that would be affected by the exemption.

Limiting the exemption to certain areas (such as Urban Growth Areas or specific subbasins) and to certain wetland types (e.g., Category IV wetlands, those with non-native species, non-riparian wetlands) will help minimize the risk of losing important functions. Additionally, it may be important to limit the total acreage of wetlands exempted on a project basis or within a subbasin.

A more appropriate way to deal with small wetlands would be to exempt projects from the need to avoid small wetlands. This type of exemption should still require that the loss of wetlands be compensated either directly or through an in-lieu fee program.

8.3.3.2 Size of Minimum Wetland Impact

As with exempting a certain wetland size, there is no scientific basis for exempting wetland impacts under any particular size without an analysis of the cumulative effects of the exemption. A study of the management area is needed in order to measure the net result of the exemption as applied over time. If a local government chooses to move forward with an exemption for small area impacts, a restoration program and/or in-lieu fees program should be created to offset the net impacts.

8.3.3.3 Isolated Wetlands

There is absolutely no scientific justification for exempting isolated wetlands from regulation (Volume 1, Chapter 5). Isolated wetlands are generally defined as those wetlands that are hydrologically isolated from other aquatic features. Hydrologic isolation is not a determinant factor in the function of wetlands. Isolated wetlands in Washington perform many of the same important functions as other wetlands, including recharging streams and aquifers, storing flood waters, filtering pollutants from water, and providing habitat for a host of plants and animals. Many wildlife species, including amphibians and waterfowl, are particularly dependent on isolated wetlands for breeding and foraging.

The current lack of federal regulation of many isolated wetlands is the result of very different statutory language in the federal Clean Water Act that ties federal regulation to navigable waters and interstate commerce. No such restriction exists under the GMA or any other state laws.

8.3.3.4 Prior Converted Wetlands

There is no scientific basis for exempting prior converted wetlands—also known as prior converted croplands (PCCs)—from wetland regulation under the GMA. PCCs function the same as other similarly degraded wetlands. The scientific information on prior converted wetlands is discussed below, following a description of these wetlands, and also in Volume 1, Chapter 5.

Prior converted wetlands are defined in federal law. They are wetlands that were drained, dredged, filled, leveled, or otherwise manipulated, including the removal of woody vegetation, before December 23, 1985, to enable production of an agricultural commodity, and that:

1. Have had an agricultural commodity planted or produced at least once prior to December 23, 1985;

1. Do not have standing water (ponding) for more than 14 consecutive days during the growing season; and

2. Have not since been abandoned.

However, many of the wetlands meeting these criteria are still biological wetlands (i.e., they still meet the three criteria for hydrology, soils, and vegetation) and provide important functions.

Local governments cannot rely on the federal exemption for PCCs to satisfy the best available science requirement in the GMA. Although activities in prior converted wetlands are not regulated under Swampbuster provisions of the federal Farm Bill or Section 404 of the federal Clean Water Act, the GMA requires local governments to regulate wetlands that meet the definition of biological wetlands. The GMA definition of wetlands includes PCCs that meet the three criteria in the *Washington State Wetland*

Identification and Delineation Manual. It therefore does not distinguish prior converted wetlands from other wetlands.

The original assumption behind exempting PCCs from federal regulation was the belief that these wetlands had been so altered they were no longer wetlands or no longer provided important wetland functions. However, PCCs in Washington perform similar functions as other wetlands, including recharging streams and aquifers, storing flood waters, filtering pollutants from water, and providing wildlife habitat. In some cases, PCCs have been significantly altered so they provide only minimal functions. However, in many cases, PCCs provide important hydrologic functions and may provide significant wildlife habitat or important linkages between habitats. For example, in western Washington, many PCCs used for agricultural production are ponded during the winter, when overwintering waterfowl are highly dependent upon flooded agricultural fields for resting and feeding areas. Overwintering bald eagles and other raptors, in turn, depend on the waterfowl attracted to these flooded areas. Even highly altered PCCs continue to provide important functions.

Local governments that rely on the Corps of Engineers to verify wetland delineations need to ensure that wetland delineations are conducted and verified using the state wetland delineation manual to determine if they are wetlands regulated under the GMA. Once these wetlands are delineated properly, a function assessment can be conducted to evaluate the functions being provided by the wetlands. We recommend that PCCs be regulated similarly to other wetlands (i.e., commensurate with the functions they provide). Most PCCs will be Category III or IV wetlands under the state wetland rating systems.

8.3.3.5 Irrigation-Induced Wetlands

Some confusion exists as to whether wetlands that have expanded or have been formed due to the influence of irrigation are considered "jurisdictional"—that is, regulated under federal, state, or local laws. Many of the native habitat types with deep soils in eastern Washington have been converted to agriculture. A large portion of this land, particularly in the Columbia Basin, is under irrigation. Additionally, some agricultural areas in western Washington are also irrigated. In many irrigated areas, the groundwater table is higher than it was prior to implementation of irrigation. Many wetlands have expanded or formed adjacent to irrigation conveyance systems and in low-lying areas where irrigation occurs and downslope of irrigated lands.

The definition of wetlands comes into play when trying to clear some of the confusion. The same definition of wetlands is used in the three state laws that regulate wetlands: the Growth Management Act (RCW 36.0A.030(20)); the Shoreline Management Act (RCW 90.58.030 2(h)); and the Water Pollution Control Act (WAC 173-201A.020). This definition reads:

> *Wetlands means areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation*

> *typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas. Wetlands do not include those artificial wetlands intentionally created from nonwetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway. Wetlands may include those artificial wetlands intentionally created from nonwetland areas created to mitigate conversion of wetlands,*

Basically, this definition means:

1. A wetland must have indicators of three features: water (wetland hydrology), plants (hydrophytic vegetation), and soils (hydric soils). It must have enough water to support water-dependent plants, so the water must be present during the growing season. The presence of water creates low-oxygen conditions that support those specialized plants and also creates unique soil characteristics.

2. The demarcation between "natural" (jurisdictional) and "artificial" (non-jurisdictional) wetlands is also made under the definition. The definition requires that, for a wetland to be non-jurisdictional ("artificial") it must meet both of the following characteristics:

    a. Be intentionally created; and

    b. Be located in a non-wetland (upland) site.

The term "intentionally created" and the examples given in the definition require that the artificial wetland not be the result of an accident or an unexpected byproduct of some other intentional act. Therefore, the types of situations where artificial, non-jurisdictional wetlands are found are where someone intentionally creates a water feature such as a ditch or pond. The only situation where an artificial, non-jurisdictional wetland results from an unintentional action is when construction of a road (after July 1, 1990) inadvertently creates a new wetland.

The term "non-wetland" means an area where wetland characteristics are lacking—that is, an upland area. Thus, if someone intentionally creates a new water feature, such as a ditch or pond, in an area that was already wetland, the new water feature is still under jurisdiction as a wetland.

The following examples may help illustrate real world situations.

1. A ranch pond was built on a dry hillside to supply water to livestock, and wetland conditions have formed over time. Clearly the pond meets both criteria for being an artificial, non-jurisdictional wetland: It is an intentionally created water feature in an upland site.

2. Wetland vegetation is found along the edge of an irrigation canal. The canal is an intentionally created water feature. If the canal was dug through uplands, then the wetland within the canal is non-jurisdictional per GMA (though it may be subject to federal regulation). If the canal was dug through an existing wetland, then the wetlands within the canal are jurisdictional.

3. A wetland is found downgradient of a leaking irrigation canal or pipe. The wetland is jurisdictional because it is an unintentional result of digging the canal. However, the canal (or a leaking irrigation pipe) can be repaired or lined to improve water conservation. If the wetland disappears as a result of the improvement, the loss of the wetland is not regulated. If wetland conditions persist, then the wetland cannot be further altered without a permit.

4. A wetland is found within a field that is irrigated. The wetland is jurisdictional because it was not intentionally created. Although filling the wetland would be regulated, changes in irrigation practices (such as changing from flood to drip irrigation) that would dry up the wetland would not be regulated.

5. A wetland is found in a field that is not irrigated, but irrigation water from a field higher up has raised the groundwater table. The wetland is jurisdictional because it was not intentionally created as part of a water feature.

6. Wetland indicators (water, plants, and soils) are found within a stormwater pond. The wetland is not jurisdictional if the stormwater pond was created in an upland. However, if the stormwater pond was created within a wetland, then it is jurisdictional.

8.3.3.6 Clearing, Grading, and Placement of Fill

The scientific literature does not support blanket exemptions for clearing, grading, and placement of fill in wetlands or their buffers without first understanding the direct and cumulative effects of such an exemption. Critical area regulations should be crafted to address these activities because of their significant and direct impacts to wetlands and their functions.

If a local jurisdiction believes it is important to exempt small amounts or areas of filling or grading in wetlands or their buffers, they should provide some analysis to document the potential cumulative impacts of such an exemption and provide some means of offsetting the expected cumulative impacts. This could include in-lieu fee and/or non-regulatory restoration programs to restore wetlands or increase wetland functions,

provided that non-regulatory programs are evaluated to ensure that the "no net loss" goal is met.

To address cumulative effects of multiple small fills or clearings in the same wetland, the threshold for clearing, grading, or filling a critical area or its buffer should be reduced to zero.

8.3.3.7 Ongoing Agriculture

One of the goals of the GMA is to protect critical areas. Equally important is that the GMA seeks to maintain and enhance natural resource-based industries, encourage the conservation of productive agricultural lands, and discourage incompatible uses. Designated agricultural lands are one of the three types of natural resource lands defined in GMA for which local governments need to plan.

Volume 1 synthesized the effects of agricultural activities on wetlands. The purpose of this volume is not to further evaluate or frame the issue of agricultural impacts. It is important, however, to recognize that different types of agricultural practices result in different types of potential impacts. Local governments should consider the types of agriculture being practiced in their watersheds and craft their critical area protection programs to address impacts from agriculture accordingly.

However, given that existing, ongoing agricultural activities take place in already drained and/or actively manipulated wetlands, impacts from bona fide ongoing agricultural activities are most effectively managed through best management practices. **Ecology and Fish and Wildlife recommend the use of best management practices (BMPs) and/or conservation plans for farming activities.**

There are two basic approaches that local governments should consider:

1. **Voluntary with monitoring.** Encourage the use of BMPs, farm conservation plans, and incentive-based programs to improve agricultural practices in and near wetlands. Rely on Conservation Districts or county staff with agricultural expertise to provide technical assistance to willing landowners. Set up and implement a monitoring program to determine if the voluntary approach is effective. If problems are detected, require the use of specific BMPs and the approval of farm conservation plans in order to correct identified problems.

   OR

2. **Required BMPs and/or farm conservation plans.** These could be approved by an agency or organization with expertise in agricultural practices (such as a Conservation District), with appropriate local government oversight and monitoring. This type of approach is outlined in the 2003 CTED *Critical Areas Assistance Handbook* where it describes how Whatcom County has approached this issue:

Some agricultural uses are regulated by state or local government, usually because of a particular environmental concern related to ground or surface water or air quality. For example, Whatcom County regulates pre-existing agricultural activities that impact wetlands, fish and wildlife habitat conservation areas, and aquifer recharge areas or their buffers in conformance with an adopted conservation program. The conservation program is developed to be consistent with the Whatcom Conservation District's best management practice manual and requires the containment of livestock waste. The plan is then filed with both the conservation district and the county, to ensure that the agricultural practices are being implemented. Periodic monitoring of farm activities ensures that the management objectives are being met.

The CTED handbook acknowledges that while regulations provide certainty, they can be difficult and costly for agricultural activities, particularly without the understanding and cooperation of the landowners.

8.3.3.8 Conversion of Wetlands to New Agriculture

Conversion of wetlands that are not currently in agricultural use to a new agricultural use should be regulated by the same regulations as any new development. The scientific literature does not support the conversion of wetlands to new agricultural uses without review and conditioning through a critical areas ordinance.

8.3.3.9 Conversion of Agricultural Lands to Other Uses

A change in use from agriculture to non-agricultural uses should trigger review under the critical areas ordinance. Exemptions and special considerations for wetlands (such as targeted implementation of best management practices) crafted for agricultural activities should not be "grandfathered" when the land use changes from agriculture to another form of development. A change in use from one type of agricultural activity to another type of agricultural activity should be addressed through best management practices and farm plans.

Of particular concern is that a change in land use may be preceded by an activity that may be exempted by a local government because alterations may occur to the wetland before adequate review takes place. A common example is the exemption in many critical areas ordinances for the maintenance of existing drain tiles and ditches on drained agricultural lands. Ditches and drain tiles require maintenance from time to time in order to keep the water table low enough during the growing season for agricultural production. As long as the lands are being maintained for ongoing agricultural use, the maintenance exemption makes sense, provided that the original depth and dimension of ditches and tiles is maintained.

The conflict arises when the land is evaluated for a change in use. Often the ditch and tile system is enlarged or upgraded to effectively drain the farmed wetlands so they no longer meet the definition of a wetland. Such a change in management is the point where

the local government has an interest in reviewing the change in use. Many agricultural areas often provide important habitat and other hydrologic functions (previously discussed in the section on "prior converted wetlands"). Therefore, a critical areas ordinance should specify what constitutes "maintenance," what does not, and what documentation is necessary to prevent wetland draining activities conducted under the guise of maintaining ongoing agriculture.

8.3.3.10 Noxious Weed Removal

Many current critical areas ordinances do not require a permit for the control and removal of noxious weeds in wetlands and buffers (as well as other critical areas), provided that the control is done by hand or with light equipment and does not involve the use of hazardous substances. Local governments should retain some oversight authority when more extensive control methods are proposed to make sure that wetland functions are adequately protected.

8.3.3.11 Forest Practices and Conversions

Forest practices on commercial woodlots and forest lands are regulated by state law. The Forest Practices Act (RCW 76.09 and WAC 222) contains less stringent wetland protection standards (for commercial forestry) than are required under the GMA for non-forest lands. The Forest Practices Act does not protect forested wetlands from harvest and has weaker avoidance, buffer, and mitigation standards than most local regulations. It provides buffer protection standards for certain non-forested wetlands and bogs. The assumption in the Forest Practices Act is that forested wetlands recover many of the affected functions during the time that they regenerate for another timber harvest cycle.

However, the GMA requires that local governments protect the functions provided by forested wetlands. It is appropriate for critical areas ordinances to recognize the regulatory gap between the GMA and the Forest Practices Act and provide a framework to ensure compliance with the stricter standard when forest lands are converted in the urbanizing interface. The jurisdiction should regulate the conversion of lands when they will no longer be considered under the rules of forest practices. The ordinance should provide guidance on how this issue will be managed in jurisdictions that interface with forest practices. It is important to note that the provisions should apply only to lands converted out of forest practices and are not intended to make the Forest Practices Act consistent with the stricter requirements in the GMA for forested wetlands.

8.3.3.12 Hazard Tree Removal

Provisions for the trimming or removal of hazard trees in buffers are legitimately addressed through an exemption to a critical areas ordinance. Public safety considerations are an important element in balancing exemptions with the goal of protecting critical areas. The needs for limits on the exemption are obvious: The exemption should be limited to situations where the "offending" tree is clearly a hazard, and removing the tree would not adversely affect the functions of a wetland or its buffer.

One option is for the local government to involve consultation with a qualified arborist who has an understanding of the functions of wetlands and buffers to evaluate a request to remove a hazardous tree.

The qualified arborist should establish that the hazard tree presents an imminent hazard and is threatening a structure. Some local governments use the definition in the Forest Practice Rules (WAC 222-21-010(4)) which define a "danger tree" as "any qualifying timber reasonably perceived to pose an imminent danger to life or improved property." This applies to any tree within 1.5 tree-lengths of the structure. The Washington State Department of Natural Resources (DNR) is not, however, charged with administering the requirements in the GMA. A local government should not therefore defer the determination of what constitutes a hazard tree, or the review of hazard tree cutting proposals, to DNR or DNR standards.

The exemption process should not allow for the creation of "view corridors" and the removal of healthy trees in a buffer under the pretext of hazard tree control. When trees are removed, a restoration plan should be required. In some instances, pruning (not topping) of trees to maintain (not create) a limited view corridor may be considered by a jurisdiction as appropriate. A management plan for a view corridor, prepared by a certified arborist, should be required by the jurisdiction. The plan should also be reviewed by qualified staff or an on-call arborist, paid for by the applicant. This approach is recommended to reduce the cases of illegal clearing to create a view, leaving the jurisdiction to deal with a code enforcement action.

8.3.3.13 Non-Compensatory Restoration and Enhancement

As discussed below, provisions for non-compensatory restoration and/or enhancement activities may legitimately be addressed as exemptions through a critical areas ordinance, provided that limits are defined so that proposals narrowly focused or managing for a single function are not allowed to occur at the expense of other wetland functions.

Restoration and enhancement activities are considered non-compensatory when they improve wetland functions (and/or increase wetland acreage) and are not meant to compensate for impacts caused by development. Many restoration activities are by definition "self mitigating" in that they may cause temporary impacts (during construction) that are ameliorated by the significant increase in function resulting from the activity.

Some non-compensatory activities are not beneficial from a landscape perspective because they are narrowly focused or do not fit the hydrogeomorphic setting in which they are carried out. Narrowly focused activities are those that provide benefits to single species at the expense of other wetland functions. For example, in the past some waterfowl management projects have been constructed to significantly increase waterfowl production, while reducing habitat for non-waterfowl species. An extreme example would be the clearing of a forested wetland for the construction of an impoundment to attract waterfowl.

Local governments should not assume that restoration activities supported by other agencies won't result in a tradeoff of functions and should carefully look at the merits of the proposal. Beneficial projects should be encouraged as a means to offset net losses in the regulatory arena, provided that they result in wetlands of the appropriate hydrogeomorphic class and are supported by landscape processes.

Local governments may also consider relaxing some of the procedural requirements typically reserved for compensatory mitigation projects. For example, a requirement for the recording of a restriction on an easement or deed for a "native growth protection area" may only serve to needlessly frustrate a legitimate non-compensatory project. It may be appropriate for a local government to set up a separate review process for non-compensatory projects that is focused on facilitating legitimate projects while still complying with requirements of the GMA.

8.3.3.14 Stormwater Management

The use of wetlands for stormwater management should be included in the list of regulated activities. Most wetlands are adversely affected when they are modified to treat and/or detain urban stormwater. The literature, much of it based on research done in the Puget Sound area, suggests that there are very narrow circumstances under which wetlands can be managed to meet the stormwater requirements of new (and retrofitted) development. While it may be appropriate in some situations to allow a low-quality wetland to be used as part of a stormwater management facility, local review and permitting should be required.

Guidance on stormwater management

Ecology has published a manual to provide local jurisdictions a commonly accepted set of technical standards and guidance on stormwater management measures based on the current state of the science and the best technical information available. The 2001 revision to the *Stormwater Management Manual for Western Washington* reflects the current state of the science on best management practices to minimize stormwater impacts on receiving waters, including wetlands, on the west side of the Cascades. The manual is used to address the issues of water quality and water quantity effects on downstream receiving waters such as wetlands. In western Washington, the 2001 Ecology manual should be used by local governments to implement best available science for the protection of functions in wetlands driven by hydrologic processes. Ecology is currently working on a stormwater management manual for eastern Washington.

Details about changes to and requirements of the western Washington stormwater manual are available on the internet at: http://www.ecy.wa.gov/programs/wq/stormwater/manual.html.

The final draft eastern Washington stormwater manual is available at http://www.ecy.wa.gov/programs/wq/stormwater/eastern_manual/index.html.

8.3.4 Wetland Rating

A wetland rating system is a useful tool for dividing wetlands into groups that have similar needs for protection. The scientific literature makes clear that wetlands in Washington are incredibly diverse (see Volume 1, Chapter 2). Wetlands occur in a wide variety of locations as a result of very different influences (geomorphology, geology, water source, etc.) and have a wide range of characteristics that contribute to different types and degrees of functions.

Wetland rating systems allow for tailoring of protection standards to the specific needs of different types of wetlands. They offer a scientifically defensible approach to assigning protection standards as well as providing a significant degree of predictability for applicants. For example, buffer widths and mitigation replacement ratios can be determined based upon a wetland rating in addition to other factors.

A wetland rating system should divide wetlands into categories based on an understanding of how wetlands function and how they are affected by human activities. A rating system should use clear criteria for determining wetland categories and include methods for making category determinations. Without detailed methods it is not possible to consistently apply rating criteria. The primary factors that should be used to rate wetlands are:

- The **rarity** of the wetland type;
- The **irreplaceability** of the wetland type;
- The **sensitivity** of the wetland type to adjacent human disturbances; and
- The **functions** performed by the wetland type.

Ecology has revised the wetland rating systems that were previously developed for eastern and western Washington based on the best available science. These rating systems were developed by interdisciplinary teams that included local planners and have been field tested across the state. If a local government wants to revise one of these updated rating systems or develop its own, it should do so based on the best available scientific information and should include a detailed method for making site-specific decisions about categorization.

Approaches for applying protection measures by incorporating the wetland rating are discussed in Appendices 8-C through 8-F.

The *Washington State Wetlands Rating Systems* are available at http://www.ecy.wa.gov/programs/sea/wetlan.html.

8.3.5 Requirements for Wetland Reports

To limit the need for comprehensive review of all project submittals, some jurisdictions may choose to implement a two-tiered review process to segregate projects with minor or *de minimus* impacts from those requiring more in-depth review and analysis. To facilitate a tiered approach, the local jurisdiction would collect all readily available information about the project site to make an initial determination. The CTED *Critical Areas Assistance Handbook* (Appendix F) includes a "critical area identification form outline" that lists a series of indicators and project information that can be included on a form to help identify the likelihood of an impact to wetlands and other critical areas. Often, a determination about the likelihood of impacts to a critical area can be determined with some basic information. In most circumstances, a jurisdiction would need to have a wetland inventory that is based on a certain amount of ground-truthing of National Wetland Inventory and hydric soils data.

For projects that will likely involve impacts to wetlands and will require mitigation, the example code provisions in Appendix A of the CTED handbook include language on what local governments should ask for and require in a wetland report. Considerations for wetland report requirements in a critical areas ordinance include, but are not limited to:

1. Preparation by a qualified professional;
2. Use of scientifically valid methods and studies in the preparation of the report;
3. Minimum report contents, which set the threshold for determining whether the report is complete;
4. Study area limits; and
5. Compensation requirements, performance standards, construction plans, monitoring and maintenance, contingency plans, financial guarantees, and other details.

Ecology and Fish and Wildlife recommend that the requirements for wetland reports, as outlined in the CTED handbook, be included in a local jurisdiction's critical areas code or the administrative rules adopted for implementing the code. The importance of local staff capacity in reviewing report submittals is covered in Section 8.2.2 of this chapter.

8.3.6 Sequencing

Sequencing (often referred to as mitigation sequencing) is the process of working through a series of steps to determine what types of impacts may be permitted and what types of compensatory mitigation may be appropriate. Generally, this sequencing process is described as follows:

1. **Avoiding** the impact altogether by not taking a certain action or parts of an action;

2. **Minimizing** impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps, such as project redesign, relocation, or timing, to avoid or reduce impacts;

3. **Rectifying** the impact by repairing, rehabilitating, or restoring the affected environment to the conditions existing at the time of the initiation of the project;

4. **Reducing or eliminating** the impact over time by preservation and maintenance operations during the life of the action;

5. **Compensating** for the impact by replacing, enhancing, or providing substitute resources or environments; and

6. **Monitoring** the required compensation and taking remedial action when necessary.

The primary decision to be made with respect to avoidance is one of risk management. For example, impacts to Category I wetlands (which are rare, sensitive to disturbance, irreplaceable, or perform a high level of functions) are higher risk and should have to pass a higher avoidance threshold than impacts to a Category IV wetland. Category IV wetlands are usually significantly degraded, provide a low level of functions, and may be more readily replaced. If the goal is to protect existing functions, it makes sense to apply more stringent protection to those wetlands that are rated higher in the rating system. See Appendices 8-A through 8-F for further discussion of incorporating the wetland rating into regulations.

8.3.7 Compensatory Mitigation Requirements

Mitigation is defined legally as the six-step sequencing process described in the previous section. Wetland impacts can be significantly reduced or avoided altogether by following the first four steps in the sequence (avoiding, minimizing, rectifying, and reducing or eliminating impacts). When wetland impacts are unavoidable, the fifth and sixth steps in the sequence are engaged (compensating for impacts and monitoring compensation actions).

Step five is commonly referred to as compensatory mitigation. Implementing this step requires considerable attention to detail because the issues are complex and the current track record of compensatory mitigation is variable (see Volume 1, Chapter 6). Local regulations on compensatory mitigation need to address the issue of how best to replace the wetland functions and values that will be lost due to the proposed impacts.

Based on the review of the scientific literature in Volume 1, compensatory mitigation regulations need to address the following issues:

- The training and funding of regulatory staff to review, implement, and follow through with proposed compensation plans;

- Standards for the type, location, amount, and timing of the compensatory actions; and
- Clear guidance on the design considerations and reporting requirements for compensation plans. This requirement allows the local agency to make a decision about the adequacy of the proposed compensatory mitigation.

A two-part joint report on compensatory mitigation was recently published by Ecology, the U.S. Army Corps of Engineers, and the U.S. Environmental Protection Agency. It is titled *Guidance on Wetland Mitigation in Washington State: Part 1 - Laws, Rules, Policies, and Guidance Related to Wetland Mitigation* (Ecology Publication 04-06-013a, April 2004); and *Part 2 – Guidelines for Developing Wetland Mitigation Plans and Proposals* (Ecology Publication 04-06-013b, April 2004).

Part 1 of this joint document outlines the general mitigation policies and requirements of federal and state agencies. Part 2 provides detail on what information should be included in a compensatory mitigation plan. Local governments are encouraged to adopt mitigation policies consistent with Part 1. This will help ensure consistency between levels of government and streamline the permitting process for applicants. The language in Appendix 8-B is consistent with Part 1. Local mitigation regulations should reference Part 2 as the standard for what should be included in a mitigation plan.

8.3.7.1 Compensatory Mitigation Standards

The review of the scientific literature makes clear that compensatory mitigation has frequently failed to adequately replace wetland area and functions (see Volume 1, Chapter 6). The reasons for failure, among others, include:

- Poor site selection;
- Poor site design;
- Inappropriate or inadequate goals, objectives, and performance measures;
- Lack of sufficient water;
- Inappropriate water regime;
- Poor implementation;
- Inadequate maintenance; and
- Lack of regulatory follow-up.

The reasons listed above point to a need for rigorous standards to address the type, amount, and location of mitigation projects that are permitted, and the type and extent of information that must be provided in a mitigation proposal. An adequately trained and

funded regulatory staff is also vital for performing permit review, compliance monitoring, and enforcement.

Standards for compensatory mitigation should specifically address the following issues:

Goals of compensatory mitigation: The standards need to include a statement about the primary intent of compensatory mitigation. Is it to replace the functions being lost by the permitted impact? Is it to achieve greater area or functions? Are tradeoffs in functions allowed (i.e., allowing replacement with different functions than the functions being lost)? Generally, the goal of compensatory mitigation should be to achieve equivalent or greater area and functions.

Types of mitigation actions: Compensatory mitigation typically includes five basic types of activities:

- Creation or establishment of new wetlands where none previously existed;
- Restoration of new wetland area and functions where wetlands previously existed (also called re-establishment);
- Restoration of wetland functions in an existing wetland area that is significantly degraded (also called rehabilitation);
- Enhancement of some wetland functions in an existing wetland that may reduce other functions; and
- Preservation of an existing wetland that is otherwise likely to experience degradation (because it is not currently well protected by existing laws).

Standards for compensatory mitigation should specify whether any of these types of activities are preferred over others. Generally restoration is preferred because it is the most likely to succeed. Enhancement typically provides the least gain in functions, and preservation always results in a net loss of wetland area; thus, these types are usually the least preferred.

Replacement of function vs. area: Standards should address whether wetland area and function must be replaced on an individual project basis and to what extent tradeoffs in functions can be made. It is a good idea to require a minimum of 1:1 replacement of wetland area except in unique circumstances, such as when it can be clearly demonstrated that a lesser area of wetland can provide greater functions than are being lost. It is reasonable to require that compensatory mitigation replace the same functions as are lost except when tradeoffs in functions are identified as desirable in a regional plan. As a general rule, replacement of the same functions on a project basis will help ensure that significant tradeoffs are not made on a landscape or basin scale without fitting into clearly identified regional priorities.

Location of mitigation: Historically, most regulatory agencies required that mitigation activities be performed "on-site" (on or very near the same parcel where the impact occurred). This was based on the belief that the closer the mitigation was to the impact

site, the better chance it would have of replacing the functions that were lost. However, recent studies have concluded that this requirement too often has forced applicants to try to fit a mitigation project into an area that makes little ecological sense and is not sustainable. Mitigation standards should emphasize that mitigation activities must occur in a location where the targeted functions can reasonably be accomplished and be sustainable. For example, the site needs to have an appropriate source of water and allow for control of invasive species. Adjacent land uses need to be compatible with the long-term functioning of the site. It makes no sense to create a new wetland for amphibian habitat in a location surrounded by dense urban development.

Amount of mitigation: The issue of how much mitigation area needs to be provided to compensate for lost wetland area is one of the most important and most contentious aspects of compensatory mitigation. The review of the science indicates that compensatory mitigation frequently fails to produce the targeted wetland area and/or function, and that it can take as long as 20 years to more than 100 years for a newly created or restored wetland to perform some functions. Mitigation ratios are a tool that is commonly used to equalize the tradeoffs between the wetland lost and the mitigation wetland.

While the overall goal is to replace lost functions with equivalent new functions, the reality is that it generally takes greater acreage and considerable time to provide equivalent functions. Additionally, some types of compensatory mitigation actions (enhancement, preservation) provide no new area and only a few new functions. Mitigation ratios provide a means of equalizing the disparities inherent in compensatory mitigation and act as a kind of "interest rate" to address the temporal loss of function associated with the difference between when the permitted wetland impact occurs and when the compensatory wetland is fully functioning.

However, every mitigation project is unique and it is possible to create or restore a wetland and provide greater functions than those that are being lost if the impacts are to a significantly degraded wetland. Additionally, some types of mitigation projects are more likely to succeed than others, particularly if good hydrologic information is available. Thus, mitigation ratios need to be flexible to address the wide range of situations that are encountered.

The recommended approach is to establish general mitigation ratios based on the wetland category and the type of mitigation activity, and then adjust the ratio on a case-by-case basis to account for project-specific factors. Criteria for increasing or reducing ratios should be specified in the standards. This provides some degree of predictability for applicants while retaining the flexibility to make site-specific adjustments.

Suggested code language for mitigation ratios is provided in Appendix 8-B. Guidance on compensatory mitigation ratios for use with the western and eastern Washington wetland rating systems is provided in Appendices 8-C and 8-D, respectively. Appendix 8-F provides the rationale behind these mitigation ratios.

Timing of mitigation: Generally, mitigation actions are conducted concurrently with or soon after when the wetland impact occurs. Standard ratios are typically established

based on this assumption. If mitigation is conducted in advance of the impacts, then the risk and temporal loss are reduced and the ratio should be reduced commensurately. If the mitigation is conducted well after the impact, the ratio should be increased.

8.3.7.2 Special Types of Compensatory Mitigation

In addition to addressing the more common mitigation activities (creation, restoration, and enhancement), local jurisdictions should consider including language specifying the circumstances under which special types of compensatory mitigation may be used, such as preservation, mitigation banks, in-lieu fee programs, and programmatic mitigation areas. These types of programs are discussed below.

Preservation

The preservation of existing wetlands as a means of compensating for wetland impacts is highly controversial because it always results in a net loss of wetland area and is perceived as trading one wetland for another one that is already protected. The reality is that some wetland types are not adequately protected under existing laws and can benefit from being placed in public ownership or protected by a conservation easement.

For example, many forested wetlands can be logged under current laws, and wetlands with significant habitat value are very difficult to protect without large buffers and corridors to connect them to other habitats. Preservation of large tracts of wetlands and uplands can provide benefits that are impossible to achieve using typical regulatory approaches. One way to think about the issue of "net loss" with respect to preservation is that some wetlands are going to experience unmitigated impacts unless they are preserved. In that sense, preservation provides a "net gain" over what would otherwise occur.

Preservation has the following basic advantages as a compensatory mitigation tool:

- Larger mitigation areas can be set aside due to the higher mitigation ratios required for preservation.
- Preservation can ensure protection for high-quality, highly functioning aquatic systems that are critical for the health of the watershed and aquatic resources that may otherwise be adversely affected.
- Preservation of an existing system removes the uncertainty of success that is inherent in a restoration, creation, or enhancement project.

Generally, the use of preservation to compensate for impacts is appropriate only in very limited circumstances. The preservation of a high-quality wetland in the same watershed where a wetland loss has occurred, however, is often an acceptable form of compensation when done in combination with restoration, creation, and enhancement.

The use of preservation of wetlands as compensatory mitigation should not allow applicants to circumvent the standard mitigation sequence of avoiding and minimizing

impacts first, followed by compensating for unavoidable losses. Additionally, preservation projects should be subject to the same requirements as other types of wetland mitigation: monitoring, long-term protection, and stewardship. Preservation of wetlands generally requires significantly higher ratios to offset impacts than wetland creation or restoration projects.

Preservation of at-risk, high-quality habitat may be considered as part of an acceptable mitigation plan when the following criteria are met:

1. Preservation is used as a form of compensation only after the standard sequencing of mitigation (avoid, minimize, and then compensate); and

2. Creation, restoration, and enhancement opportunities have also been considered, and preservation is proposed by the applicant and approved by the permitting agencies as the best mitigation option; and

3. The preservation site is determined to be under imminent threat; that is, the site has the potential to experience a high rate of undesirable ecological change due to on-site or off-site activities. This potential includes permitted, planned, or likely actions; and

4. The area proposed for preservation is of high quality or critical for the health of the watershed or basin due to its location.

Mitigation Banks

Mitigation banks offer an opportunity to implement compensatory mitigation at a regional scale and provide larger, better connected habitat in advance of impacts. Mitigation banking involves the generation of "credits" through restoring, creating, enhancing and, in exceptional circumstances, preserving wetlands and other aquatic resources. These credits can then be sold to permit applicants who need to offset the adverse environmental impacts of projects that would occur within the "service area" of the bank. A bank's service area is akin to its "market area" or the geographic area in which credits may be sold or used. Projects that use bank credits as compensation are called "debit projects."

Wetland mitigation banks have two basic components:

- The physical site where mitigation bank credits are generated by restoring, creating, enhancing, and/or preserving wetlands and associated natural resources.

- An organization operating under the provisions of a mitigation banking instrument that markets and sells credits, maintains a bank ledger, monitors and reports on the development of the bank site, and provides perpetual protection, management, and other services for the bank site.

Bank sites are normally protected in perpetuity by a legally binding protective covenant such as a conservation easement held by a long-term manager. Bank sponsors must also provide one or more temporary financial assurances to ensure the successful ecological

development of the bank and an endowment to fund long-term management of the bank site(s).

Once released for sale, wetland bank credits are sold to permit applicants to compensate for wetland impacts that occur within the service area of the bank. As credits are sold, bankers debit them from the bank's ledger so they cannot be resold. Once all credits in a bank have been sold, the bank is closed.

Mitigation banks benefit the aquatic environment by consolidating numerous small wetland mitigation projects into larger, potentially more ecologically valuable projects. This results in economies of scale that benefit the regulated public, regulatory agencies, and the environment. Another important feature of mitigation banks is that they are developed in advance of the adverse impacts for which they compensate, which ensures that the bank is ecologically successful before it is used to offset adverse impacts at other sites. Properly implemented mitigation banks offer improved ecological performance, lower mitigation costs to permit applicants, and a more streamlined permit process.

To date, few mitigation banks have been approved in Washington. However, as the regulatory agencies develop and implement bank review and approval processes and gain experience in evaluating mitigation bank proposals, mitigation banks are likely to become more common in Washington.

As with any form of compensatory mitigation, the use of mitigation bank credits to offset impacts to the aquatic environment should not be considered prior to completing the two mitigation sequencing steps of avoidance and minimization. Then, the regulatory agency must determine whether purchasing credits from a particular bank would provide appropriate and practicable compensation for a proposed impact. In making its determination, the regulatory agency should consider whether any environmentally preferable compensatory mitigation opportunity (e.g., on-site mitigation) is available, how closely a bank's credits correlate with the particular wetland functions that would be destroyed by a proposed action, and whether using a bank to compensate for a proposed action would be in the best interest of the aquatic environment, particularly the affected watershed.

In-Lieu Fee Programs

In-lieu fee (ILF) mitigation occurs when a permittee pays a fee to a third party in lieu of conducting project-specific compensatory mitigation, purchasing credits from a mitigation bank, or conducting some other form of compensatory mitigation. This fee represents the expected costs to a third party to replace the wetland functions that would be lost or impaired as a result of the permittee's project. ILFs are typically held in trust by a non-profit conservation organization until they can be combined with other ILFs to finance a project that replaces the lost and impaired functions represented by those ILFs. The entity operating the trust is typically an organization with demonstrated competence in natural resource management, such as a local land trust, private conservation group, or government agency that manages natural resources.

ILF mitigation is used primarily to compensate for minor adverse impacts to the aquatic ecosystem when more preferable forms of compensation are not available, practicable, or in the best interest of the environment. Compensation for projects that result in more substantial adverse impacts is usually provided by project-specific mitigation or a mitigation bank. ILF mitigation may be appropriate when:

- The amount of compensatory mitigation required for a project is too small to justify the cost of designing and implementing project-specific mitigation;
- Practicable opportunities to conduct appropriate project-specific mitigation or purchase credits from an approved mitigation bank are not available;
- Project-specific mitigation that could be implemented would likely result in a low-performing aquatic system, have a high risk of failure, be incompatible with adjacent land uses, or fail to address the needs of the watershed; or
- A minor amount of additional mitigation is needed to supplement project-specific mitigation that would not, by itself, fully compensate for a project's adverse environmental impact.

ILF mitigation and mitigation banking share many similarities. For example, both types of mitigation allow permittees to fulfill their compensatory mitigation responsibilities by paying a fee to a third party who will accept responsibility for the required mitigation. Also, mitigation banks and ILF-funded projects must both fully comply with existing federal mitigation guidance and policy, including a requirement for a written implementing agreement that normally includes construction plans, performance standards, monitoring and reporting provisions, a long-term management plan, financial assurances, protective real estate agreement (e.g., conservation easement), and other measures, as appropriate, to ensure the ecological success of each project.

The fundamental difference between mitigation banking and ILF mitigation is the relative timing of the activities that offset the adverse environmental impacts for which they compensate. With mitigation banks, the environment-enhancing activities are conducted in advance of the adverse impacts, whereas with ILF mitigation, those activities normally are not conducted in advance of the adverse impacts. While specific ILF-funded mitigation projects may not always be identified in advance of project-related impacts, quickly expending collected ILFs to fund mitigation projects should be a high priority for any ILF program. However, regulatory agencies may adjust the size of ILFs to compensate for anticipated delays in expending them.

Programmatic Mitigation Areas at the Local Level

Another approach for consolidating compensatory wetland mitigation involves directing compensation projects to a programmatic mitigation area. Simply defined, a programmatic mitigation area is a site (or series of sites) that have been identified by the local jurisdiction or a state or federal agency as the preferable site for wetland compensation. Wetland compensation projects are constructed separately on the site but are all part of a common design. The programmatic mitigation sites are subject to the

same minimum requirements as other compensation sites such as permanent protection, monitoring, restrictions on other activities on the site, etc.

The goal of programmatic mitigation sites is to allow the restoration of larger wetland areas that are important to the functioning of a stream basin or watershed because of their position in the landscape. Since many projects require relatively small areas of compensatory wetland mitigation, the programmatic mitigation area program allows the consolidation of these small compensation sites into a larger project.

How would a programmatic mitigation area program work?

1. The lead regulatory entity (county or city jurisdiction, state or federal agency) identifies an area or areas as priority restoration areas.

2. The regulatory entity develops a site development plan for the entire site and may either purchase the site or purchase an easement on the site.

3. As projects needing compensation arise, the applicants are directed to perform either certain activities on the site (to aid in the completion of the plan) or directed to implement the site design on specific areas within the overall site.

This approach has not been used much in Washington. The closest example available is Kitsap County's work along Clear Creek where several mitigation projects have been completed adjacent and complementary to each other. The county has actively directed compensation projects to the Clear Creek area. Another example is along Mill Creek in Auburn where the Emerald Green Race Track and WSDOT located their compensation sites in an area identified in the draft Mill Creek Special Area Management Plan.

8.3.8 Buffers

Buffers are defined in many ways (see Volume 1, Chapter 5) but generally include relatively undisturbed vegetated areas adjacent to critical areas such as wetlands and streams. The review of the scientific literature in Volume 1, Chapter 5, indicates that the protection of buffers around wetlands is necessary to protect wetland functions. The scientific literature also provides considerable guidance on buffer characteristics, including widths, that are necessary to protect specific wetland functions. The literature does not provide clear direction on how to structure buffer protection and management programs. However, in addition to providing technical information on buffer effectiveness, the literature provides information that should help guide the development of buffer protection policies and regulations. This information can be summarized as follows:

- Four primary factors should be considered in determining the appropriate width and character of buffers:
  - The quality, sensitivity, and functions of the aquatic resource;

  - The nature of adjacent land use activity and its potential for impacts on the aquatic resource;
  - The character of the existing buffer area (including soils, slope, vegetation, etc.); and
  - The intended functions of the buffer.

- Site-specific information is needed to determine the characteristics and width of the buffer that will make it effective.
- It is important to manage surface water discharges to wetland buffers to ensure effective treatment of pollutants.
- Generally, buffer widths "shrink" over time as a result of infringement from adjacent activities.

Ideally, this guidance should be incorporated into any local government's buffer regulations. There are, however, many different ways to incorporate this information into a buffer protection program. The challenge for local governments in Washington is to develop buffer protection and management approaches that incorporate the best available science and provide a reasonable and defensible means of establishing and maintaining effective wetland buffers.

Suggested code language for buffers is provided in Appendix 8-B. Guidance on buffers for use with the western and eastern Washington wetland rating systems is provided in Appendices 8-C and 8-D, respectively. Appendix 8-E provides the rationale behind the suggested buffer widths.

8.3.8.1 Components of Wetland Buffer Regulations

Regulations for the protection of wetland buffers should address a number of issues:

1. Standards for buffer characteristics and width;
2. Criteria and procedures for varying from a standard;
3. Allowable uses within buffers;
4. Best management practices to enhance and ensure effective buffer function; and
5. Provisions for the delineation and demarcation of buffers and their maintenance over time.

In most cases, the primary concern will be "how wide does the buffer need to be?" This issue dominates any discussion of buffer regulation and generates the most conflict. However, before determining appropriate standards for buffer widths, a local government needs to decide how best to balance the need for a predictable and cost-effective approach with the desire for a flexible approach that is responsive to site-specific situations.

The options for buffer regulatory approaches range from variable-width buffers that are determined case-by-case based on multiple site-specific factors, to fixed-width buffer standards. Between these two extremes, there are many intermediate options that combine some elements of each.

Variable-Width Approach

The case-by-case, variable-width approach is probably the most consistent with what a review of the scientific literature says about buffer effectiveness. This approach usually requires the development of a detailed formula and methodology for the consideration of site-specific factors such as wetland type, adjacent land use, vegetation, soils, and slope. By taking into consideration all relevant site-specific factors prior to determining the appropriate buffer width, this approach helps ensure that the buffer is adequate to protect wetland functions without being any larger than is necessary.

However, this approach is time-consuming, costly to implement, and provides a less predictable outcome. It requires either that the applicant hire a consultant to conduct the necessary analysis, or that the government agency staff conduct the analysis. In either event, the local government staff must have appropriate training and expertise to conduct or review the analysis. In addition, this approach requires considerable effort up front to develop the formula and methodology for site-specific evaluation. This approach also does not provide any predictability for applicants. They have no idea how large a buffer may be required until considerable time and money are invested in the analysis. Using a case-by-case, variable-width approach can also result in attempts to manipulate the site-specific data, lead to frequent haggling with applicants, and create the perception that buffer widths are determined in an arbitrary and capricious manner.

Fixed-Width Approach

By contrast, a fixed-width approach provides predictability and is inexpensive to administer. The downside of this "one-size-fits-all" approach is that it results in some buffers being too small to adequately protect wetland functions, and some buffers being larger than necessary to protect wetland functions. Over time, this inequity may erode public and political support for the buffer program. Frustrated landowners can point to the "over-regulation" of those buffers that are larger than necessary, while environmentally minded citizens can point to those buffers that are smaller than needed to protect wetland functions. It also is difficult to determine an appropriate standard width, because no single size buffer can be demonstrated to protect all wetland types adequately in all situations unless that standard width is very large. Furthermore, it is difficult to argue that a fixed-width approach includes the best available science since the scientific literature clearly recommends different buffer widths based on a variety of different factors. While no local governments in Washington currently use a single, fixed-width approach, there are several states that do (e.g., California, New Hampshire, New Jersey).

Combining the Fixed-Width Approach with Site-Specific Variables

There are several ways to modify a standard, fixed-width approach to incorporate some of the factors that contribute to buffer effectiveness. Some drawbacks of the fixed-width approach can be rectified by utilizing a wetland rating system that divides wetlands into different categories based on specific characteristics. Then, different buffer width standards can be assigned to each category. This approach provides predictable widths, yet allows some tailoring of buffer widths to wetland functions.

For example, the *Washington State Wetlands Rating System* divides wetlands into four categories based on the following wetland characteristics: rarity; sensitivity to disturbance; irreplaceability; and functions. This hierarchical rating system allows one to establish larger standard buffer widths for "more valuable" wetlands and smaller standard buffers for "less valuable" ones. Most local governments in Washington currently designate buffer widths based on the state wetland rating system or a similar approach.

Another way to tailor a fixed-width approach to address site-specific factors is to have different standard widths based on the type of adjacent land use, thus incorporating another of the four factors discussed earlier that are known to influence buffer effectiveness. A buffer regulation could require a larger buffer width for adjacent land uses with intense impacts and a smaller buffer width if the impacts from adjacent land uses are low. This approach can be combined with a wetland rating system to provide a more scientifically defensible approach.

Other critical factors, such as the characteristics of the buffer itself and the desired buffer functions, can be addressed by establishing criteria and procedures for varying from a standard width. This approach allows for some site-specific tailoring of the standard buffer width on a case-by-case basis without the need for developing a detailed formula or methodology for determining site-specific widths. In this approach, criteria for increases or reductions from the standard buffer width are developed, and the applicant or any other interested party is given the option of "making a case" as to why the standard buffer width should be increased or decreased. Agency staff then evaluate the proposal for deviation from the standard buffer width against the criteria, and decide if such a deviation is warranted.

The criteria for allowing a deviation from the standard buffer width should address the various site characteristics determined by best available science to be the most important. These include buffer characteristics such as slope, soil type, vegetative cover, and/or the habitat needs of particular wildlife species. For reducing standard buffer widths, an applicant should have to demonstrate that a smaller buffer will protect the functions and values of the wetland. This will generally require hiring a qualified expert and preparing a site-specific report for the local administrator's review and approval. It is also important to have a minimum buffer width below which the buffer cannot be reduced.

8.3.8.2 Reasonable Use Criteria

Another situation in which standard buffer widths may need to be reduced on a case-by-case basis is when protection of the buffer will result in a property owner being denied reasonable use of his/her land. For example, if a landowner has a one-acre parcel that was zoned for one single-family residence and a wetland covers 80% of the parcel, then protection of a buffer around the wetland might mean that the parcel is undevelopable. In this case, the landowner would have a strong case that protection of the wetland and buffer would deny him/her all reasonable use of the property. However, if the buffer were reduced, it may be possible to construct a single house on the property and avoid a "takings" claim.

Thus, critical area regulations should include a provision allowing for buffer reduction in situations where reasonable use would be denied. Such a provision should include requirements that the applicant demonstrate that there are no feasible alternatives to reducing the buffer such as revising the development design, that critical wetland functions or public health and safety will not be impaired, and that the inability to derive reasonable economic use of the property is not the result of the applicant's own actions, such as dividing the property in a way that created an unbuildable lot after the adoption of critical area regulations.

8.3.8.3 Buffer Averaging

Buffer averaging is a tool for balancing buffer protection with specific site development needs, or for tailoring a buffer to maximize protection of natural features in the wetland or surrounding upland. It allows a buffer to vary in width around a given wetland. For example, if the standard width for a buffer around a wetland is 100 feet, buffer averaging would allow the width to vary between a minimum and a maximum width but require that the buffer area average 100 feet in width. Typically this is done to allow development to occur closer than usual to the wetland in order to fit a particular development "footprint" onto a given site. However, it can also be used to protect a natural feature (such as a stand of trees or snags) that otherwise would fall outside of the standard buffer width. Buffer averaging can also be used to provide connectivity with adjacent habitat areas or to address those situations where pre-existing development has reduced a buffer area to a width less than the required standard.

Criteria for buffer width averaging typically require a minimum buffer width (either a designated width or a percentage of the standard buffer width) and documentation to ensure that the averaging of the buffer will improve, or at least, not impair overall buffer functions.

8.3.8.4 Uses within Buffers

Another critical issue that buffer regulations need to address is the type of uses that are allowed within buffers. Generally, buffers should be maintained in natural vegetation. However, uses that could be considered are stormwater treatment facilities (e.g.,

detention ponds and bioswales) in the buffer or trails to provide for some form of recreational use. In addition, over time, residents adjacent to the buffer might want to use it for some activity. Thus, it is essential that buffer regulations address which uses are allowed in buffers.

Generally, any use that results in the creation of impervious areas, clearing of vegetation, or compaction of soils will be incompatible with buffer functions. Typically, buffers need to be densely vegetated with appropriate native vegetation to perform water quality and habitat related functions. In most cases, this requirement precludes any human uses of the buffer. However, it may be necessary in some situations to utilize the outer area of the buffer for initial treatment of surface water runoff, via the construction of biofiltration swales or water spreading features to ensure sheet flow.

In other situations, it may be desirable to allow some focused use of the buffer for educational and recreational activities, and to prevent widespread disturbance of the buffer. If it appears inevitable that adjacent residents will use the buffer to gain access to a wetland for aesthetic or recreational enjoyment, then it may be preferable to concentrate that use in a smaller area and minimize disturbance of the soil and vegetation by constructing trails, viewing platforms, or similar facilities. Additionally, providing some educational or recreational developments in buffers may enhance the general public's understanding and appreciation of wetlands and their functions and values.

Many regulations include criteria for evaluating proposals for use of buffer areas. These criteria typically include general language about prohibited uses but allow for variances if certain conditions are met.

8.3.8.5 Enhancement and Restoration of Buffer Areas

Frequently, upland areas adjacent to wetlands have been altered by previous land use practices. In many cases, the vegetation has been cleared or significantly degraded and the soil has been disturbed. Also, it is not uncommon to find that the existing buffer area is composed of non-native vegetation. In these situations, simply "protecting" a set width of buffer area may fail to provide the necessary characteristics to protect a wetland's functions. It is usually desirable, therefore, to restore the buffer to a more naturally vegetated condition.

In other cases, a buffer area may be in relatively good condition but still be sparsely vegetated with trees and shrubs. It may be desirable in this case to improve the screening and habitat value of the buffer by planting additional trees and shrubs or other vegetation appropriate to the ecological setting.

Buffer regulations should be designed to ensure that buffers provide adequate protection of wetland functions. Standard buffer widths should be set based on an assumption that the buffer is well vegetated. In cases where the buffer is not well vegetated, it is necessary to either increase the buffer width or require that the standard buffer width be revegetated. Generally, a well-vegetated buffer will function substantially better than a poorly vegetated buffer. Regulations can essentially give the applicant the option of

revegetating the existing buffer in order to have the standard width, or foregoing buffer restoration and providing a wider but poorly vegetated buffer.

8.3.8.6 Best Management Practices to Enhance or Ensure Effective Buffer Function

Water Quality Protection

A buffer's effectiveness at improving water quality is largely a factor of how water that is carrying pollutants travels across and through the buffer. The scientific literature is full of references to pre-treatment practices that enhance a buffer's effectiveness at removing pollutants and reduce the width of buffer necessary.

In areas with agricultural or silvicultural land uses, the primary pollutants of concern are sediments, nutrients, and pesticides. Narrow (15- to 30-foot-wide) grass filter strips have been shown to be effective at removing coarse sediments and adsorbed pollutants as well as helping encourage sheetflow and infiltration of surface runoff, thus enhancing a buffer's effectiveness at removing remaining pollutants. Therefore, requiring or encouraging the construction of a narrow grass filter strip between agricultural or silvicultural areas and more naturally vegetated wetland buffers is strongly advised.

In urban areas, the pollutants of concern are primarily sediments and metals from roads, parking lots, and construction sites. Adequate treatment of stormwater runoff is critical to remove most of the pollutants and to reduce peak flows prior to discharge to a wetland or its buffer (see below for more discussion of stormwater). To encourage sheetflow and infiltration, stormwater should be dispersed through a shallow infiltration trench at the outer edge of the buffer (farthest from the wetland).

In residential areas, the pollutants of concern include sediments, metals, nutrients, and pesticides (from lawns). A combination of appropriate stormwater treatment and the use of a grass filter strip or grassy swale is recommended to pretreat and disperse surface runoff prior to introduction into a buffer.

In rural residential areas, the primary concern is pollutants such as nutrients and fecal coliform from animals. Many hobby farms in rural areas house livestock that should be kept out of wetlands and their buffers.

Stormwater Management

In addition to the introduction of pollutants, development adjacent to or upgradient from a wetland can alter the quantity and timing of surface water and/or groundwater inputs to the wetland. Considerable research has documented the adverse impacts from changes in wetland hydroperiod. The scientific literature also shows that upland buffers around wetlands do little to ameliorate these impacts except in wetlands with small contributing basins. (See Volume 1, Chapter 4, for further discussion.)

Thus, it is imperative that adequate stormwater management practices be applied to any project adjacent to or upgradient from a wetland. This includes such practices as the construction of settling/detention facilities as well as treatment with a grassy swale. Inadequately detained and treated stormwater will overwhelm a buffer's ability to filter and treat pollutants. Direct surface discharges to buffers usually result in channelized surface flow that significantly reduces pollutant removal and can erode buffers.

Refer to Volume 1, Chapter 3 for additional information on disturbances caused by urbanization.

Wildlife Habitat

The two primary actions that can be taken to reduce impacts to wildlife habitat are to (1) ensure that the wetland and its buffer are connected to other habitat areas, and (2) reduce the intrusion of noise, light, people, and pets.

Ensuring connectivity is usually an issue of site design. Some wetlands are already isolated from other habitat areas and it will not be possible to provide connectivity. On sites where wetlands are currently connected to other habitat areas, it is important to maintain that connectivity through corridors. While the scientific literature indicates that wildlife travel corridors should be as wide as 500 feet, it may be beneficial to provide a corridor of any size. Generally, corridors of less than 100 feet will only provide the cover needed for small mammals and less sensitive birds.

Local wildlife experts should be consulted to determine the appropriate corridor design for a given site. Buffer averaging can be a useful tool to help ensure connectivity with adjacent habitat areas without unduly burdening the landowner.

Reducing the intrusion of noise, light, people, and pets can be accomplished in many ways. Buffers vegetated with dense trees and shrubs are effective at reducing intrusion of noise and light. Additionally, projects can be designed to reduce noise and light intrusion by locating noisy areas such as parking lots, playgrounds, and loading docks away from the edge of the buffer. Lighting can be designed and located so it points away from the wetland and its buffer. Fences or berms can be constructed to block noise and light. Fences can also be used to limit human and pet intrusion. Dense shrubs, particularly those with thorns, can be planted along the edge of a development to block noise and light and limit intrusion.

With forethought and careful planning, projects can be designed to reduce impacts to wildlife habitat. When combined with adequately vegetated buffers of sufficient width, these measures can help ensure that disturbance to wildlife use of a wetland is minimized.

8.3.8.7 Issues in Managing Buffers

Many steps need to be considered to ensure that, once established, buffers continue to provide the functions for which they were protected. These steps frequently are

overlooked or given scant attention by local governments, resulting in the degradation of buffers over time.

Ownership of the Buffer Area

The issue of who owns the area included within a buffer is an important one. There are basically two options:

- The buffer area can be included in a separate tract or lot and held in common ownership by a homeowners association, agency, or non-profit organization; or
- The buffer can be included in lots owned by adjacent landowners.

The second option is often pursued by a developer who wants to divide the buffer among individual lots in order to achieve a required minimum lot size. However, a study by Cooke (in Castelle et al. 1992) of buffer areas in two counties in western Washington showed that buffers that were owned by many different lot owners were more likely to be degraded over time. Even with easement language on each lot owner's deed specifying the buffer protection provisions, owners tend to clear buffer vegetation over time to expand lawns, build storage sheds, or serve other uses. If the buffer area is not held in some kind of common ownership, it is much more difficult to enforce against those landowners who encroach upon its boundaries. Therefore, when feasible, wetlands and their buffer areas should be placed in a separate, non-buildable tract that is owned and maintained by an organization that is dedicated to protecting the buffer.

Buffer Delineation, Recording, and Signage

Clearly delineating and marking a buffer area helps ensure that it is not degraded over time. Following project approval, and prior to site construction, the buffer should be measured, recorded on applicable legal documents, and clearly marked on the ground. During the construction phase, constructing a temporary sediment fence or "clearing limits" fence helps to ensure that the boundary is seen by equipment operators and that the wetland and buffer are protected from erosion during construction. Following construction, a fence may still be desirable to demarcate the boundary and to limit human and pet access and reduce the intrusion of noise and light.

Placement of signs along the buffer boundary is important for two reasons: to help mark the boundary, and to help educate landowners about the purpose and value of protecting buffer areas. In areas with high potential for human intrusion and degradation of the buffer, more extensive signage explaining the value of the buffer may be necessary to develop support for protecting the buffer. In addition to signs, brochures can be developed and distributed to adjacent landowners to explain the reasons why buffers and wetlands are protected and what human activities are allowed. Typically, applicants are responsible for developing and constructing fences and signs and for distributing educational materials. However, local jurisdictions can develop standards for fences, signs, and educational materials to ensure consistency and effectiveness. Maintenance of fences and signs is typically the responsibility of the adjacent landowner or a homeowners association, if applicable, or lies with the local jurisdiction.

Buffer Maintenance

In cases where enhancement or restoration of a buffer is required, monitoring and maintaining the buffer area is essential. A monitoring/maintenance program should include evaluation of the success of plantings and provide for contingency measures if vegetation survival standards are not met. Responsibility for this is usually borne by the developer or landowner. It is also important to monitor buffer areas when human use is allowed or expected. Adverse effects of human access such as vegetation trampling, littering, and soil compaction or erosion should be monitored and corrected if found. Local jurisdictions can develop and implement a buffer maintenance and monitoring program but few have done so. Alternatively, applicants can be required to monitor and maintain buffers and submit regular reports to the local jurisdiction.

Monitoring and Enforcement

Simply designating and marking the boundaries of buffer areas is not sufficient to protect buffers in all cases. Regular monitoring of buffer areas is critical to determine whether vegetation and soils are being damaged and to ensure that adjacent development does not encroach on the buffer over time. Where illegal activities occur, enforcement actions to restore the buffer may be necessary. Local jurisdictions should establish a buffer enforcement program similar to enforcement programs for private stormwater or wastewater facilities.

8.3.8.8 Buffers in Urban Areas

A frequent concern about buffers is their applicability to urban and urbanizing areas. The concerns generally fall into two categories: (1) the science on buffers comes largely from agricultural and forestry settings and is perceived to be irrelevant to urban areas; and (2) the need to maximize density of development in urban areas is in direct conflict with the protection of large upland areas around wetlands (and streams).

The concern over the relevancy of the literature on buffers to urban areas is largely unfounded. While many of the studies of buffer effectiveness occur in non-urban settings, the principles are the same. Buffers do not function any differently in urban settings than rural settings. The same processes of sediment, nutrient, and toxics removal operate similarly in urban areas as they do in rural settings. The role of buffers in providing needed upland habitat for wetland species and in screening adjacent noise and light is also performed similarly. In fact, a case can be made that buffers in urban areas are even more important from a habitat standpoint because there is little other upland habitat available. The factors that may be different in urban areas are that urban wetlands may perform some functions at a lower level because of degradation, and the range of wildlife species utilizing urban wetlands may be smaller. However, remaining wetlands (and adjacent upland areas) in urban areas may, in fact, function as habitat islands and be critical to many species.

The issue of balancing wetland protection with competing mandates in the GMA is a legitimate one that can be addressed in a number of ways. A buildable lands survey with

a good wetlands inventory can provide important information on the actual conflicts that may exist (rather than a perceived conflict). Provisions to allow density trading from buffers to adjacent or nearby developable lands can help.

However, the best way to address the issue of buffers in urban areas is to conduct a landscape analysis and develop a subarea plan that identifies, prioritizes, and protects the most important wetland, riparian, and upland habitats (see Chapters 5 through 7 of this volume for additional discussion). Maintaining and restoring connectivity between wetland, riparian, and upland habitats is key to protecting wildlife. A landscape analysis can help identify existing connections that should be protected as well as areas where connectivity can be restored. Combined with low-impact development standards and state-of-the-art stormwater management, this kind of approach could result in smaller buffers around the other critical areas that are not providing vital habitat. The studies should always be ground-truthed during project review.

8.3.8.9 Buffers around Small Wetlands

Another frequent complaint about buffers is that it is unreasonable to require "large" buffers around "small" wetlands because the buffer can end up being several times the area of the wetland. While a strictly scientific perspective may nonetheless support the buffer size in these situations, it causes many people to question the validity or reasonableness of wetland regulations.

One option for addressing this issue that creates minimal risk to wetland functions is a variance or reasonable use exception. For those jurisdictions adopting the more detailed buffer approach (Alternative 3) described in Appendices 8-C and 8-D, there is unlikely to be a problem because this approach provides reasonable ways to reduce buffers.

However, for those jurisdictions wanting to adopt a more basic buffer approach, it may be appropriate to develop criteria for allowing buffer reductions around small wetlands, particularly in Urban Growth Areas. Some possibilities include:

- For Category II or III wetlands smaller than 10,000 square feet with a habitat score of less than 20 points (in the Ecology rating system), reduce the standard buffer width by 50%.

- For Category IV wetlands smaller than 10,000 square feet, make the buffer 25 feet wide.

It may be important to limit this type of reduction by allowing it only within Urban Growth Areas, not allowing it with buffer averaging, and requiring fencing or some other type of demarcation around the buffer boundary.

8.4 Monitoring the Effectiveness of Regulatory Programs

A local government should be able to track decisions made in the implementation of its critical areas ordinance and produce regular status reports for the public to review. This is an important step to demonstrate that the goals and requirements of the GMA are being met. The monitoring program should be able to answer questions such as:

- How many wetlands have been affected by permit decisions?
- How many acres have been filled?
- How many buffer reduction requests granted? Have buffers been increased?
- How well have the mitigation projects succeeded in replacing wetland acreage and function?
- How many variances issued? How many exemptions granted? How many violations?
- How much non-compensatory restoration is being done?
- How many impacts have been avoided? Where?

Without the collection of these data, a local government cannot evaluate how well it is doing in moving toward a "no net loss" goal for its regulatory program. Furthermore, these data are an integral part of a local government's "adaptive management" approach because they allow decision-makers to improve the regulations based on real (vs. perceived) data.

The monitoring program does not have to be complicated but should be linked to the goals established for the regulatory program (discussed in Section 8.2). A regulatory program that adopts rigid requirements will not require as much data collection as one that relies on case-by-case flexible implementation. Flexible programs by design represent a higher risk to wetlands because case-by-case decision-making can lead to greater cumulative effects than more rigid regulatory programs. (See "balancing predictability with flexibility" in Section 8.2.1.). Many of these data can be collected as part of follow-up work for permit compliance.

This chapter has not outlined minimum items to include in a monitoring program because they are entirely dependent on what is adopted in code. See Chapter 12 of this volume for additional information on monitoring and adaptive management.